## Space Weather Forecast

Issued on Sunday, 04 September 2022 at 00:02 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts. G1/G2 inor/Moderate Geomagnetic Storm expected day 1 and day 2 (04th & 05th Sep).**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Low, with periods of common class flares throughout. Of the four active regions on the visible disc, AR3089 remains the largest and most complex region. This region continues to grow in areal extent and complexity, now with a delta configuration. The other 3 sunspots in the east remain relatively small and simple, largely inactive with no or limited growth. No Earth-directed CMEs (Coronal Mass Ejections) were observed.

**Solar Wind / Geomagnetic Activity:** The solar wind was indicative of a transition to a high speed stream, most likely from CH19/+. The solar wind speed increased from 400 to 570 km/s early in the period to finally settle around 480-540 later. The magnetic field strength was initially weak but became moderate for a time between 03/0500-1000 UTC, before becoming weak again. Geomagnetic activity was Unsettled to Active with one G1/Minor storm period at 03/0000-0300 UTC.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is at background levels, with no solar radiation storms occurring.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Solar activity is expected to remain largely Low, with an ongoing chance of Moderate flares at times, mostly from AR3089. However, a new region may rotate onto the northeast limb on 05 Sept (day 2), potentially increasing the probabilities of significant flares.

**Solar Wind / Geomagnetic Activity:** The CME that left the sun on 02 Sept may give Earth a glance on day 2 (05th). No other Earth-directed CMEs expected otherwise. Solar winds are expected to be mostly elevated through the period, perhaps strong on day 1, due to the onset of the HSS originating from a large coronal hole. Geomagnetic activity is expected to remain Unsettled to Active from day 1 (04th) to day 3 (06th), then Quiet to Unsettled on day 4 (07th). Some G1/G2 Minor/Moderate storm intervals are probable on day 1 (04th), due to the onset of the HSS from CH20/+, and perhaps on day 2 (05th), under coronal hole and CME influences.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is likely to remain below the Minor Radiation Storm level (S1). There remains a slight chance of further increases to or above the S1 level, should any significant flares occur from the large region on the visible disc.

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Met Office

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | Yes | 80 | 50 | 5 | 1 |
| Strong | G3 | No | 10 | 5 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | No | 30 | 35 | 35 | 35 |
| Very Active | R3 to R5 X | No | 3 | 3 | 3 | 3 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 3 | 3 | 3 | 3 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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